

DOCUMENT RESUME

ED 357 016

SP 034 462

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TITLE Teaching Critical Thinking (A Practical Approach).
PUB DATE Mar 93
NOTE 9p.; Paper presented at the Annual Meeting of the American Alliance for Health, Physical Education, Recreation and Dance (Washington, DC, March 24-28, 1993). Contains 7 illustrative diagrams that may not reproduce clearly.
PUB TYPE Speeches/Conference Papers (150) -- Reports - Descriptive (141)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Class Activities; Convergent Thinking; *Critical Thinking; Decision Making Skills; *Discovery Learning; Divergent Thinking; Elementary Education; Evaluative Thinking; *Learning Activities; *Physical Education; Problem Solving; Teaching Methods; *Thinking Skills
IDENTIFIERS Guided Discovery Approach; *Spectrum of Teaching Styles (Mosston)

ABSTRACT

Teaching critical thinking, a relatively new area and concept in physical education, can take the form of problem solving--the development and presentation of physical and mental problems that challenge students to reach a solution. Providing students with conceptually well-defined and designed problems can give physical education teachers an opportunity to provide an experience which addresses all domains and developmental channels. A number of models can be used to develop the critical thinking/problem solving abilities of students. They all share elements that can be distilled to a few common factors: identification of the problem, development and trial of strategies, and evaluation. This paper addresses Mosston's Spectrum of Teaching Styles which presents this type of content. The use of convergent discovery and divergent production, along with opportunities for the use of guided discovery, are what drives this type of curriculum presentation. Several examples of physical education activities utilizing divergent production and convergent discovery are presented. Each activity provides a statement of the problem, descriptions and diagrams of needed equipment and set-ups, levels of difficulty, and indications on safety precautions. (LL)

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ED357016

TEACHING CRITICAL THINKING
(A Practical Approach)

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PAPER PRESENTED
1993 AAHPERD NATIONAL CONVENTION AND EXPOSITION
WASHINGTON, D.C.

March 25, 1993

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Teaching Critical Thinking

(A Practical Approach)

Teaching critical thinking is a relatively new area and concept in physical education and in the general school curriculum. Relatively, because it has always existed in some form or another. People have always used critical thinking skills to meet challenges in school settings and in life. The present interest in critical thinking is unique because it is now the organizing center for the curriculum. There are a number of forces in education and general culture that are driving this movement. The insights and greater understanding of; cognitive processes, teaching styles, learning styles, group social behavior and cooperative learning are a few contributing factors. There is a pressing need to go beyond what we have done in the past; to step out into new areas of physical performance and thought; to expand the scope of what physical education is. As a result of these factors and many more this is a curriculum area that has come of age.

From my perspective, teaching critical thinking has taken the form of problem solving - developing and presenting physical and mental problems that challenge students and cause them to engage in critical thinking to reach a solution. Providing students with structured and

conceptually well-defined and designed problems can give a physical education teacher an outstanding opportunity to provide an experience which addresses all domains and developmental channels. Children are cognitively involved, introspective, creative, supportive, compassionate, ethical, honest, altruistic, hard working, and much more. When engaged in problem solving activities, critical thinking is what they do.

Children own the work they produce. They are empowered. They make themselves successful by meeting challenges, facing failure and learning from their experiences. Self-concept is enhanced in a most positive way. Children are exposed to and learn the interdependency that is the reality of life. Beyond the theoretical, philosophical, and psychological aspects that can be discussed, problem solving/critical thinking is fun and exciting.

A number of models can be used to develop the critical thinking/problem solving abilities of students. They all share elements that can be distilled to a few common factors: identification of the problem, development and trial of strategies, and evaluation. These things can take place in a sequential order or almost all at the same time. We know that thinking is not always a linear or a step-by-step process. There are times when flashes of insight take place; when fully developed ideas wash over the

mind. We now encourage children to develop their own strategies or ways of dealing with the questions we pose. Children validate their own thought processes by engaging in problem solving activities.

There are any number of ways this type of content can be presented. The challenge is to the individual teacher to do some creative and critical thinking/problem solving themselves to develop content and procedures that fit their individual situations. The creative involvement of the teacher is a vital aspect of venturing into this curriculum area. A practical and conceptual understanding of Mosston's Spectrum of Teaching Styles is almost a prerequisite to presenting this type of content. The extensive use of Style G (Convergent Discovery), Style H (Divergent Production), with a liberal sprinkling of opportunities for the use of Style F (Guided Discovery), are what drives this type of curriculum presentation.

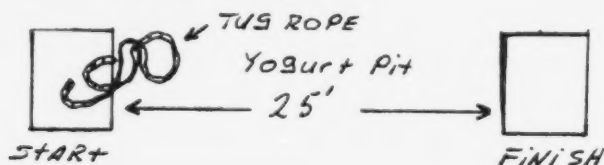
The following pages list a number of problems and variations of them that can, hopefully, be a start. They are only a starting point and are not meant to be all inclusive or even explained in their fullest terms. In some ways, a challenge is being offered. Take what you experience today and build on it. This quote seems to put everything into perspective. "The true object of human life is play. Earth is a task garden. Heaven is a playground" (G.K.Chesterton).

The Yogurt Pit (Divergent Production. Style H)

I. The Problem: The purpose of this problem is to get the entire group from one side of the yogurt pit (gym floor) to the other using only a Tug-of-War rope. No one may touch the floor at any time but, the rope has the ability to float on poison yogurt.

II. Equipment and Set-up:

- A. two mats or lines placed about 25' apart.
- B. one Tug-of-War rope.



III. Levels of Difficulty:

- A. increase distance between the mats.
- B. put obstacles up that must be crossed either over or under or both.

IV. Safety:

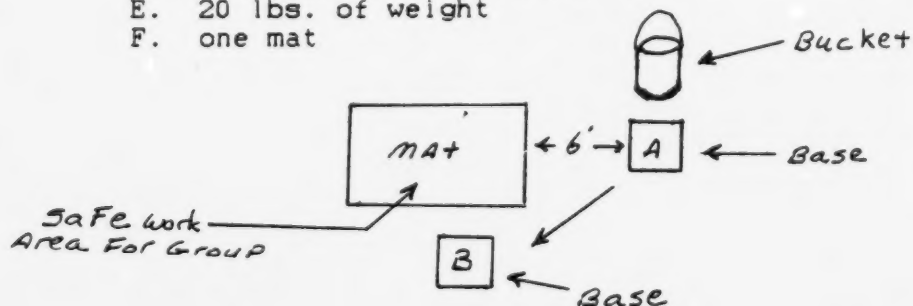
Children must keep out of the way of swinging rope. They can't pull the rope when another child is on the rope or not ready.

Nuclear Waste Transfer Problem or Poles and Rope Lift Problem: (Divergent Production. Style H)

I. The Problem: The group must move a container of nuclear waste (a five gallon bucket with weight in it) from one place to another. They must stay in a safe place and not touch the waste or step into the area where the waste is contained. They must build a machine using two poles and a rope to move the waste 90 degrees (from point A to B) to a safe place.

II. Equipment and Set-up:

- A. 2 bases
- B. 2 poles about 8' in length
- C. 1 rope 20' in length
- D. 5 gallon plastic bucket
- E. 20 lbs. of weight
- F. one mat



III. Levels of Difficulty:

- add weight to the bucket
- increase the distance between point A and B
- add scooter - group must now create a machine that is able to lift and move

IV. Safety:

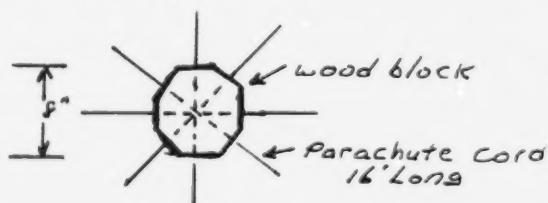
Kids must be under control and keep the poles away from the faces of others in the group.

U238 Transfer or Radioactive Isotope Transfer: (Style G)

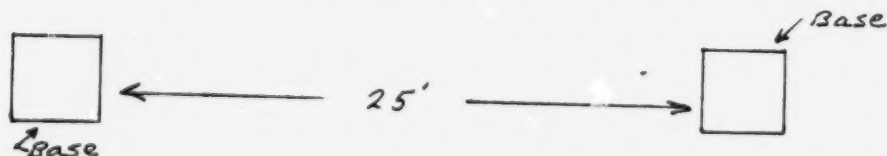
I. The Problem: The object of this problem is to treat a cancer patient with radiation. The group of doctors must move an isotope out of the lead containment vessel (a base) to the patient who is some distance away (25') and on a treatment table (another base). The group must stay at the ends of the ropes so they avoid contamination. They also must never drop the isotope (a 2 liter soda bottle) off an eight-sided wood block with parachute cords through it.

II. Equipment and Set-up:

- 2 rubber bases
- one 2 liter soda bottle
- wood block: eight-sided and 8" across - block has four $\frac{3}{8}$ " holes drilled through the sides.
Block size: 2x8x8



- parachute cord strung through the block - four cords each approx. 16' in length.



III. Levels of Difficulty:

- increase distance between the bases
- travel over and back to the starting point
- Place obstacles that the doctors must go over or under.

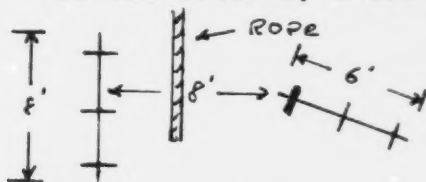
- IV. Safety: Don't let the group whip the wood base around.

High Rise Disaster Problem or Wood to Wood (Divergent Production, Style H).

I. The Problem: The object is for the entire group to escape from the roof of a burning high-rise to the safety of the roof of another high-rise. The only equipment is a rope suspended between the two buildings from a helicopter. The burning building is simulated by 2"x4"x8' piece of lumber placed on three blocks. The building representing safety is simulated by another piece of lumber 2"x4"x6' also on three blocks. A climbing rope is used to simulate the helicopter and rope.

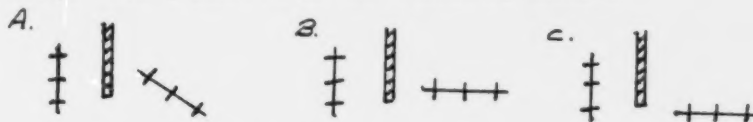
II. Equipment and Set-up:

- A. 1 climbing rope
- B. one 2"x4"x8' stud
- C. one 2"x4"x6' stud
- D. six blocks made out of 2x4's just to get the studs off the floor by a few inches.

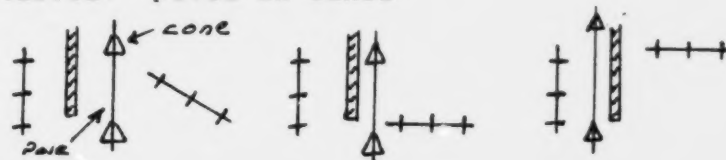


III. Levels of Difficulty:

1. increase the distance between the start and finish boards.
2. change the positions of landing board



3. obstacles: poles on cones



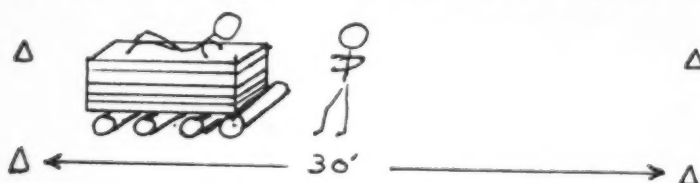
- IV. Safety: Use safe spotting procedures. Protect the head. Encourage kids to step off the boards if they lose their balance. They may not climb the rope.

The Mat and Roller Problem or The Pharaoh's Stone
(Divergent Production, Style H)

I. The Problem: The task in this problem is to move a stone (folded mat) across the desert (gym floor) on rollers (carpet tubes) without ever letting the mat touch the desert sands (gym floor). Half of the group must be on top of the stone (as overseers) while the other half moves the rollers. Half way through the journey the groups exchange rolls. One added point: overseers may never touch the desert sands.

II. Equipment and Set-up:

- A. one folded mat
- B. six cardboard carpet rollers - each one 3 or 4' in length
- C. cones or a tape line to mark the start and finish



III. Levels of Difficulty:

- A. increase the distance between the start and finish points
- B. reduce the number of rollers that can be used
- C. place obstacles in the path of the stone -
Ex. A pole balanced on cones that the stone will go under but the participants on top of the stone must go over.
- D. The entire group must stay on the mat and also move the rollers.

IV. Safety: Group must keep the rollers under control at all times.

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- Mosston, M. (1966). Teaching physical education from command to discovery. Columbus, OH: Charles E. Merrill.
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